

App. No. 10/621,981

Reply to Office action of December 19, 2005

REMARKS/ARGUMENTS**A. Summary of the Amendment**

This is a full and timely response to the non-final Office Action dated December 19, 2005. Reexamination and reconsideration are courteously requested. By way of the present amendment, claims 1, 14, 17, 22 to 23, and 29 are amended. Further, claims 13, 15 to 16, and 32 to 46 are canceled. Claims 32 to 46 were previously withdrawn as the result of an earlier restriction requirement that resulted in the election of claims 1 to 31 for examination. Thus, claims 1 to 12, 14, and 17 to 31 remain pending for the Examiner's consideration, with claims 1, 17, 22, 23, and 29 being independent claims.

B. Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1 to 16, and 22 to 23 are rejected as being indefinite due to alleged lack of clarity regarding the recitation of segmentation gaps and their relationships with other claimed elements. The current amendment adds clarity in this respect, and the rejections under 35 U.S.C. § 112 are believed to be overcome.

C. Rejections Under 35 U.S.C. § 102

Claims 1 to 4, 6 to 7, and 12 are rejected as being anticipated by either U.S. Patent No. 6,103,386 (Raybould) or U.S. Patent No. 6,395,343 (Strangman). These rejections are moot in view of the present amendment, which incorporates claim 16 into claim 1 so that claim 1 recites a concentration gradient transitioning between two different materials in segmented ceramic layers. Since these features in claim 1 are admittedly not taught or suggested by Raybould or Strangman, the rejections under 35 U.S.C. § 102 should be withdrawn.

App. No. 10/621,981

Reply to Office action of December 19, 2005

D. Rejections Under 35 U.S.C. § 103(a)

The rejections of claims 8 to 11 as being unpatentable over either Raybould or Strangman in view of U.S. Patent No. 4916,022 (Solfest) is moot in view of the present amendment. Also, the rejections of claims 1 to 12 as being unpatentable over U.S. Publication No. US 2005/0064213 (Subramanian) in view of Solfest is moot in view of the present amendment, which incorporates claim 16 into claim 1 so that claim 1 recites a concentration gradient transitioning between two ceramic layers. Since these features in claim 1 are admittedly not taught or suggested by Raybould, Strangman, Subramanian, Solfest, or the combination of the references, these rejections should be withdrawn.

Claims 1 to 9, 11 to 15, 17 to 21, 23 to 25, and 28 to 31 are rejected as being unpatentable over U.S. Patent No. 6,924,040 in view of Subramanian, Raybould, or Strangman. Claims 10, 16, 22, 26, and 27 are rejected as being unpatentable over the same combination of references, and further in view of Solfest. These rejections are respectfully traversed.

Independent claims 1, 17, and 29 are amended to recite a transition region, between two segmented columnar ceramic layers, in which stabilized zirconia concentration decreases and a stabilized hafnia concentration increases along a transition gradient. Basis for the amendment is found in canceled claim 16, and in the specification, e.g. paragraphs 0035 and 0039. This feature is neither taught nor suggested by any of the cited prior art, alone or in combination. In the Office Action, the Examiner refers to claim 16 but does not address the claimed feature of a concentration gradient. Further, Maloney is the only cited prior art references that discloses an embodiment in which hafnia is layered over zirconia, but the layers are not separated by a transition region in which the zirconia concentration decreases and the hafnia concentration increases. For at least this reason, the rejections of claims 1, 17, and 29, and all claims depending therefrom, should be withdrawn.

All of the independent claims (1, 17, 22, 23, and 29) recite that columns are formed in a segmented yttria stabilized hafnia layer disposed on top of a first segmented columnar ceramic layer that also has columns formed therein, and that a structure-stabilizing material is interposed between columns of the segmented yttria stabilized hafnia layer. To emphasize the novelty of

App. No. 10/621,981

Reply to Office action of December 19, 2005

this feature, claim 23 recites the stabilizing material in the top layer in Jeppson type format. The uniqueness of this feature is evident by the fact that none of the prior art references teaches or suggests any type of segmented columnar ceramic layer that has a structure-stabilizing material interposed between columns, and is formed on top of another columnar ceramic layer. The Examiner's position appears to be that since Subramanian discloses a structure-stabilizing material (yttrium aluminum oxide) in a lower columnar ceramic layer, it would be obvious to interpose the same material in both the upper and lower columnar ceramic layers disclosed by Maloney. However, there is no motivation set forth in the prior art to do so. The several prior art references that disclose the use of a structure-stabilizing material do not suggest the need for another layer with such material formed therein. Maloney, the only reference that discloses the use of stacked columnar ceramic layers, does not disclose the need for structure-stabilizing material whatsoever. Thus, a person of ordinary skill would not divine the top columnar ceramic layer, including a structure-stabilizing material, from the cited prior art. For at least this reason, the rejections of all of the independent (and dependent) claims should be withdrawn.

Finally, claims 22 and 23 recite that the upper columnar ceramic layer is thinner than the lower columnar ceramic layer. In contrast, Maloney, the only reference that discloses the use of stacked columnar ceramic layers, suggests that the upper layer is thicker than the lower layer by contrasting the two layers using the description "thin" when mentioning a lower YSZ layer (col. 6, line 45). Basis for this feature is found in the present specification at paragraph 0032. Since the prior art fails to teach or suggest this feature, the rejections of claims 22 and 23, and claims depending from claim 23, should be withdrawn.

E. Conclusion

In view of Applicant's amendments and remarks, it is respectfully submitted that Examiner's objections and rejections have been overcome. Accordingly, Applicants respectfully submit that the application is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further discuss this

App. No. 10/621,981

Reply to Office action of December 19, 2005


application, Applicants request that the Examiner contact the Applicants attorneys at the below-listed telephone number.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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